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BOB,

AS DISCUSSED JUST NOW

BEST REGARDS

TONY SMITH
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PROJECT THE INTERNETNote. JGR No. 01Continued From Page 1CUSTOM MOTOR OILS USING THE INTERNET

1. SUMMARY
2. CONCEPT
3. DATA AND CREDENTIALS
4. DESIGNING THE OIL
5. MANUFACTURING THE OIL
6. THE INTERNET
7. CONCLUSION

1. SUMMARY

A RECENT E-BUSINESS MEETING AT PISCATAWAY (12/9/99) WAS DEDICATED TO EXPLORING NEW IDEAS RELATING TO THE USE OF THE INTERNET, AND HOW IT COULD ENHANCE CASTROL'S BUSINESS. ONE OF THE IDEAS DEVELOPED DURING THE SESSION WAS TO ALLOW CUSTOMERS, BOTH RETAIL AND COMMERCIAL, TO TAKE ADVANTAGE OF THE POSSIBILITIES FOR INTERACTIVE PRODUCT DESIGN THAT THE INTERNET OFFERS, EVEN ON AN INDIVIDUAL CUSTOMER LEVEL.

CUSTOMERS WOULD ACCESS A CASTROL WEB SITE THAT WOULD PROMPT THEM (FOR EXAMPLE) FOR DETAILS OF THEIR VEHICLE AND THEIR DRIVING AND MAINTENANCE STYLE (OR HOUSE STYLE/MARKETING EMPHASIS FOR A COMMERCIAL CUSTOMER).

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THE CUSTOMER COULD THEN CHOOSE BETWEEN HAVING AN OIL RECOMMENDED FROM CASTROL'S NORMAL PRODUCT RANGE OR TO DESIGN THEIR OWN OIL, OPTIMIZED FOR THEIR OWN NEEDS AND WANTS USING FORMULATING GUIDELINES AND COMPUTER MODELS MADE AVAILABLE TO THEM IN REAL TIME. THE MODELS COULD LIMIT THE EXTREMES OF FORMULATING FLEXIBILITY IN ORDER TO MAINTAIN CREDENTIALS, OR GIVE A WARNING THAT SUCH CREDENTIALS COULD NOT BE SUPPORTED OUTSIDE A GIVEN RANGE.

HAVING DESIGNED THEIR OWN MOTOR OIL, THE CUSTOMER DECIDES WHERE IT SHOULD BE DELIVERED: TO A DEALER, A GARAGE, A QUICK-LUBE STATION OR ELSEWHERE. A FLEXIBLE BLENDING FACILITY MAKES AND PACKAGES THE OIL (PERHAPS WITH THE CUSTOMER'S NAME OR GRAPHIC INCLUDED IN THE PACK DESIGN) AND DESPATCHES IT. AN EXTENSION OF THIS IDEA IS TO HAVE A MOBILE OIL CHANGE BUSINESS OR FRANCHISE THAT WOULD INSTALL (AND POSSIBLY EVEN BLEND) THE CUSTOM OIL AT THE CUSTOMER'S HOUSE, PLACE OF WORK OR OTHER LOCATION.

2. CONCEPT (SEE DIAGRAM OPPOSITE - PAGE 3)

3. DATA AND CREDENTIALS

KEY TO A LUBRICANT ARE THE CREDENTIALS IT CARRIES. THESE GUIDE THE CUSTOMER IN CHOOSING THE RECOMMENDED OIL FOR THEIR

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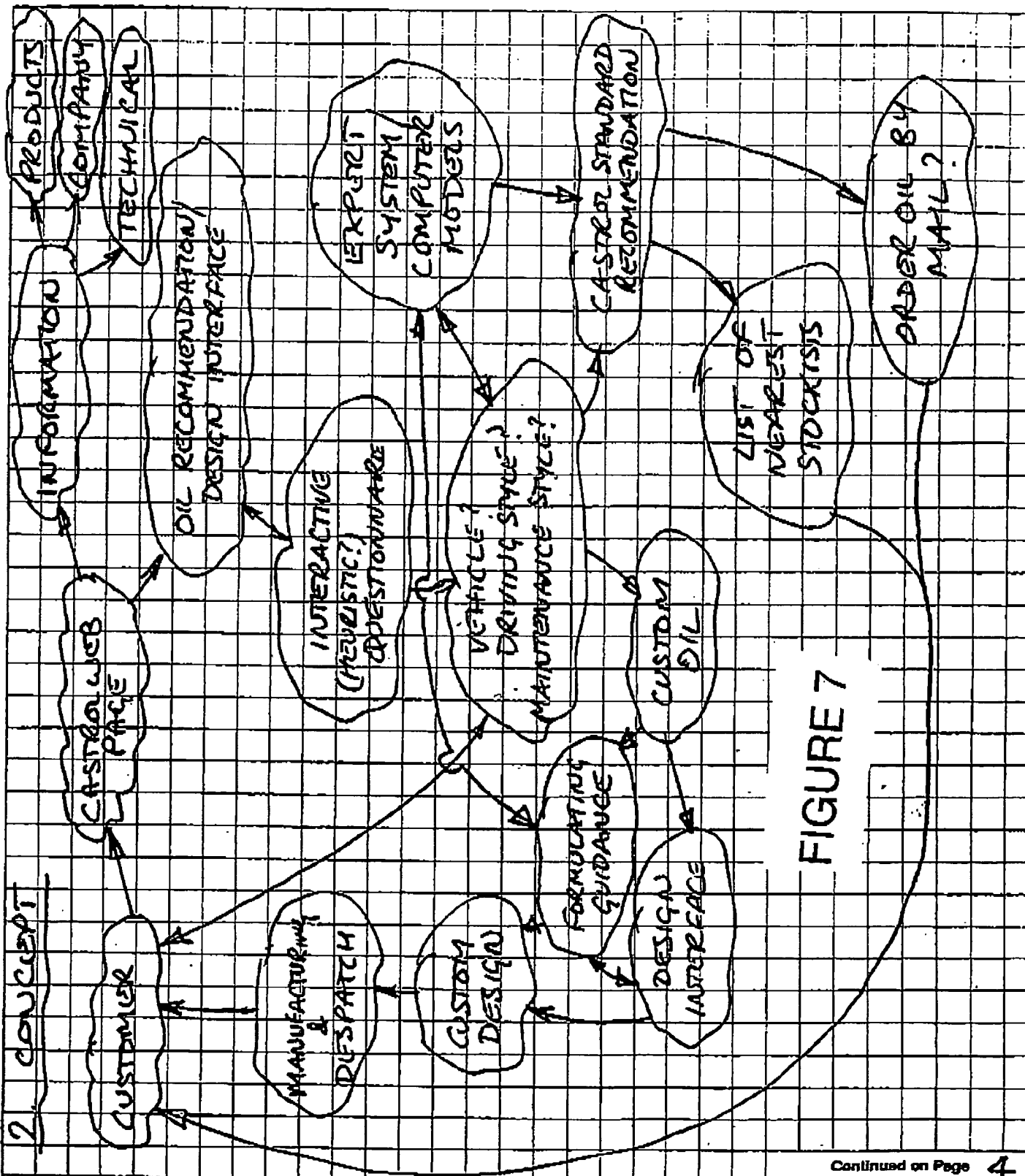
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APPLICATION, AND CAN SUPPORT WARRANTY CLAIMS ETC. IF THE CUSTOM PERFORMANCE ENHANCEMENTS WERE OFFERED AS ADDITIONAL FEATURES ON TOP OF A BASELINE OF INDUSTRY STANDARD PERFORMANCE, THEN ENGINE PROTECTION AND PERFORMANCE WOULD ALWAYS BE ABOVE A MINIMUM. AN OIL'S PERFORMANCE CAN BE MODIFIED WHILST RETAINING ITS CREDENTIALS BY USING INDUSTRY GUIDELINES. (EXAMPLES OF THESE ARE THE CMA AND AIZ PROGRAM AND PROGRAMME EXTENSION GUIDELINES.) THESE PERMIT THE ADDITION OF EXTRA PERFORMANCE ADDITIVE COMPONENTS TO GIVE INCREASED PERFORMANCE. THE CUSTOMER COULD PICK FROM A MENU OF SUCH ENHANCEMENTS:

FUEL ECONOMY
ENGINE STARTABILITY
OXIDATION PROTECTION
LOW OIL VISCOSITY
CLIMATE RELATED OILS
OEM CREDENTIALS
WEAR PROTECTION

COLD TEMPERATURE PROPERTIES
ENGINE CLEANLINESS
VOLATILITY IMPROVEMENT
COOLER RUNNING ENGINES
EXTENDED DRAIN
SOOT HANDLING

THESE ARE JUST A FEW SELECTED EXAMPLES OF WHAT COULD BE OFFERED.

THESE CHOICES WOULD BE COMMUNICATED DIRECT TO THE MANUFACTURING FACILITY, WHERE THE APPROPRIATE OIL COULD BE MADE AND SHIPPED.

CLAIM RETENTION IS SHOWN IN THE DIAGRAM OPPOSITE - PAGE 5

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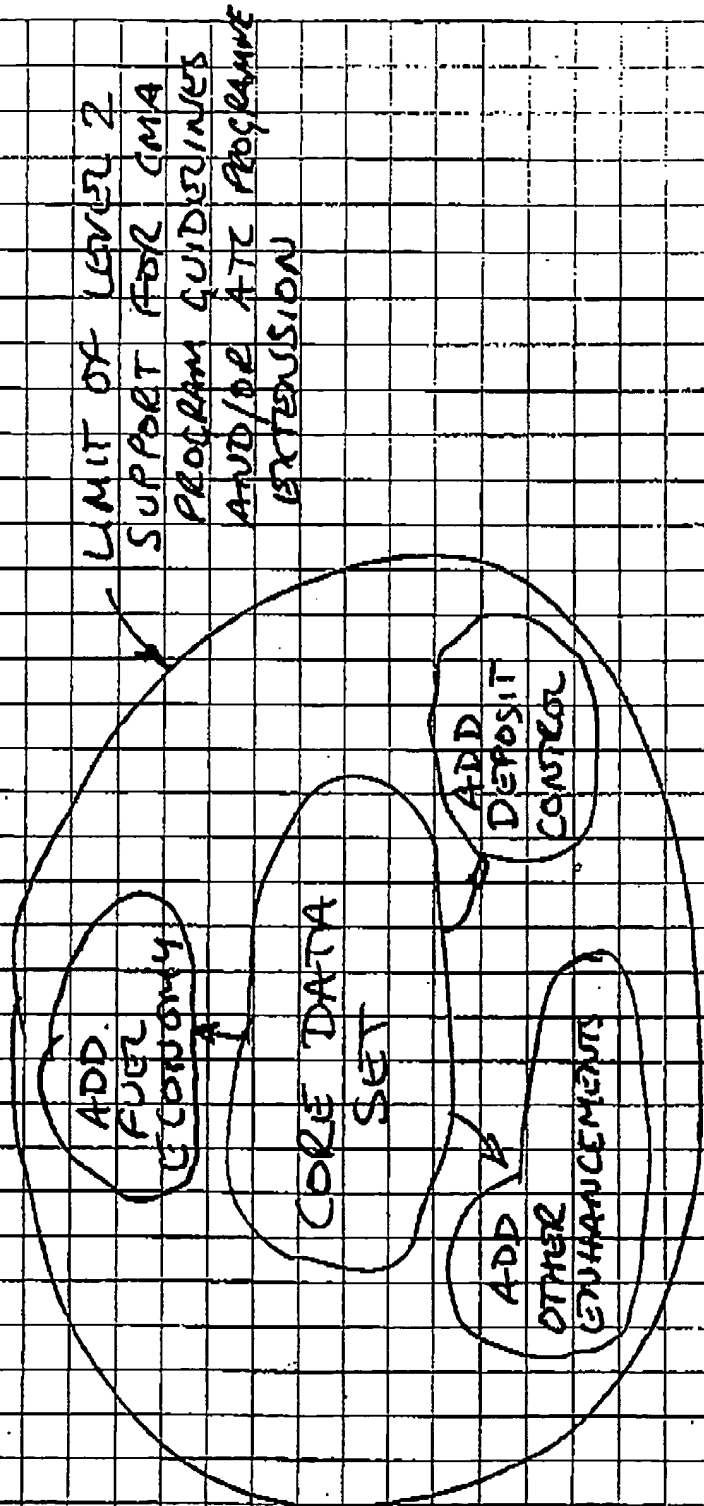
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**CUSTOM M.C. OR OIL
PROJECT USING THE INTERNET**

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RETENTION OF CLAIMED CREDENTIALS:



BOTH THE INDIVIDUAL AND CUMULATIVE ENHANCEMENTS
NEEDED TO COMPLY WITH CMA/ATC (OR OTHER) INDUSTRY
GUIDELINES

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4. DESIGNING THE OIL

THE CUSTOMER MIGHT HAVE LITTLE OR NO KNOWLEDGE OF THE SCIENCE AND TECHNIQUES OF FORMULATING MOTOR OILS, BUT STILL DESIRE TO CREATE AN OIL THAT MEETS THEIR PARTICULAR NEEDS. THEY WOULD THUS NEED ACCESS TO ON-LINE FORMULATING GUIDANCE AS AN INTEGRAL PART OF THE DESIGN PROCESS. SUCH GUIDANCE, ESSENTIALLY PROVIDED BY AN INTERFACE TO AN EXPERT SYSTEM, COULD TAKE THE FORM OF GRAPHICAL REPRESENTATIONS OF STATISTICALLY-DERIVED PERFORMANCE MAPS, WHICH WOULD BE MORE INTUITIVE AND CLEARER THAN SIMPLE NUMERIC MODELS. THE PERFORMANCE ENHANCEMENT OFFERED WOULD NEED TO BE COMPREHENSIVELY TESTED IN ORDER TO:

- PROVIDE THE MAPS IN THE FIRST PLACE
- ESTABLISH 'LEVEL TWO SUPPORT' FOR ADDING THE COMPONENTS AS PROGRAM GUIDELINES OR PROGRAMME EXTENSIONS
- PROVIDE DATA IN ORDER TO REFUTE ANY LEGAL CHALLENGES

THE GUIDANCE COULD ALSO HAVE A HEURISTIC ELEMENT GIVING RELEVANT ASSISTANCE AS THE DESIGN PROGRESSES.

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5. MANUFACTURING THE OIL

MANUFACTURING CUSTOM MOTOR OIL COULD INVOLVE DIFFERENT MANUFACTURING TECHNIQUE THAN ARE USED TODAY. ADDITIVE COMPONENTS FOR EXTRA PERFORMANCE TYPICALLY TREAT AT 1.0% WT OR LESS OF THE FINISHED FLUID. INTRODUCING THESE NEAT INTO A BASELINE OIL COULD MEAN THAT MIXING AND COMPATIBILITY WOULD BE DIFFICULT SO THE BOOST COMPONENTS MIGHT NEED TO BE MUCH MORE DILUTE THAN IS NORMAL. (A SIMPLIFIED EXAMPLE OF A POSSIBLE MIXING SCHEME IS SHOWN IN THE DIAGRAM OVERLEAF - PAGE 8.)

USING DILUTE INGREDIENTS MEANS THAT IT WOULD BE EASIER TO USE A CONTINUOUS IN-LINE BLENDING TECHNIQUE WHICH WOULD HELP IN THE RAPID PREPARATION OF SMALL QUANTITIES OF CUSTOM OIL

6. THE INTERNET

THE INTERNET ENABLES THIS WHOLE PROCESS. THERE ARE SEVERAL AREAS THAT WOULD NOT BE VIABLE WITHOUT IT.

- REAL-TIME GATHERING OF CUSTOMER INPUT
- REAL-TIME ANALYSIS OF THESE DATA USING EXPERT SYSTEMS/MODELS TO MAKE RECOMMENDATIONS

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SIMPLIFIED MIXING SCHEME - EXAMPLE

	CUSTOMER DESIRES BASELINE PERFORMANCE	CUSTOMER DESIRES FUEL ECONOMY PERFORMANCE	CUSTOMER DESIRES FUEL ECONOMY WEAR PERFORMANCE	CUSTOMER DESIRES BOTH FUEL ECONOMY AND ANTIWEAR PERFORMANCE
2 BASELINE MOTOR OIL	100	80	80	60
2 OF 5 X MAX. BLEND CONC. OF FUEL ECONOMY ADDITIVE DISSOLVED IN BASELINE MOTOR OIL	0	20	0	20
2 OF 5 X MAX. BLEND CONC. OF ANTIWEAR ADDITIVE DISSOLVED IN BASELINE MOTOR OIL	0	0	20	20
TOTAL	100	100	100	100

THESE ARE THE MAXIMUM ADDITIVE LEVELS ANY LEVEL
LOWER THAN THIS COULD BE BLENDED

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- ON-LINE FORMULATION GUIDANCE AND DESIGN IN REAL TIME
- COMMUNICATION OF THE DESIGN TO THE MANUFACTURING FACILITY
- DESPATCH AND DELIVERY COORDINATION TRANSPARENT TO CUSTOMER

7. CONCLUSION

THE IDEA THAT CUSTOMERS MIGHT DESIGN THEIR OWN 'CUSTOM' OILS SEEMS INITIALLY FAR-FETCHED. A KEY TECHNOLOGY NOW MAKES THIS FEASIBLE: THE INTERNET. IT ENABLES CUSTOMERS TO HAVE FORMULATION CONTROL BY DESIGN, AND GIVES THEM THE NECESSARY INFORMATION AND KNOWLEDGE TO HELP THEM EXERCISE THAT CONTROL. THE RESULT IS THAT THE CUSTOMER GETS AN OIL THAT BETTER MEETS THEIR NEEDS AND WANTS, AND HAS GENUINELY PARTICIPATED IN THE PROCESS OF MAKING IT SO.

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